

**LEARN HOW
SCIENTISTS
EXPLORE THE
RED PLANET**

**AND DESIGN
YOUR OWN
ROVER!**



CURIOSITY ROVER

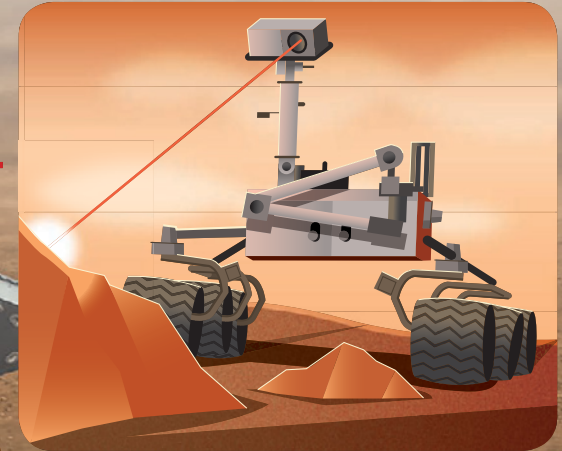
One of the most interesting spacecraft to be sent to Mars is Curiosity, a rock-blasting rover.

In 2012, NASA's Curiosity rover landed in Gale Crater on Mars. The rover is the size of a small car and is controlled by scientists on Earth. Its job is to find out as much as it can about the planet. Seventeen cameras take photos to learn more about Mars. They include ChemCam, which fires a laser to identify chemicals in rocks and soil. Curiosity searches for water, collects data on Mars's climate, and looks for signs of past or present life in the ground. Investigating Mars is slow work, though – the rover travels only 1½ in (3.8 cm) each second and has traveled a mere 12.5 miles (20 km) since landing on Mars.

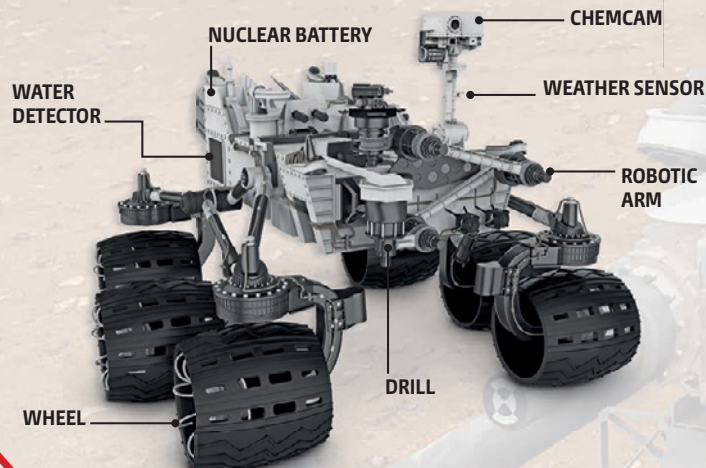


LASER POWER

Curiosity's smartest tool is called ChemCam. It combines a superpowered invisible laser, a small telescope, and a camera to learn about rocks on Mars. The laser fires blasts of heat at targets up to 23 ft (7 m) away, turning them into hot gas. The camera photographs the melting rock through the telescope and measures the colors of the gas being given off, which tells scientists what the rock is made of. ChemCam can record more than 6,000 different colors (some can't be seen with the human eye), and its telescope can see objects only 0.04 in (0.1 cm) wide from 33 ft (10 m) away.



CURIOSITY: MARS ROVER



For the curious

Content taken from DK's *Mars*



EXPLORING MARS

Astronauts on Mars will want to explore the thousands of miles that lie beyond their base, but they will only be able to walk so far...

They will need a speedy vehicle to cover long distances on Mars. Astronauts on missions to the moon in the 1970s used a four-wheeled buggy called the Lunar Roving Vehicle. They sat on top of it in their space suits to make short drives. Mars astronauts, however, might want to spend days or weeks away from their base. They might also want a place to store and study the rocks and other objects they find on their travels. The solution? Take a mini Mars base with them! NASA has designed a concept car that could explore Mars and act as a laboratory at the same time.

STREAMLINED SHAPE

The sleek, smooth car is shaped to glide through martian storms. Its body sits high off the ground, a bit like a monster truck, so it can drive over large rocks and hills without getting damaged by getting rocks wedged underneath.

DRIVER'S SEAT

The front of the car has seats for a driver, a copilot, and a third crew member. It can still be used to drive around and investigate once the back has been removed to use as a laboratory.

SOLAR PANELS

Panels on the roof and sides transform sunlight into electricity to keep the car's batteries charged and supply power for experiments.

HATCH

Astronauts enter and exit through a hatch on the vehicle.

DETACHABLE LAB

The back half of the car is a mobile laboratory and workshop. It can disconnect from the car, so experiments can continue while the rest of the car is off exploring.

HOLLOW WHEELS

The vehicle's huge wheels are designed to roll over rocks. The tires are like hollow cages, which allows dust to flow through them, rather than getting stuck in small cracks and weighing the vehicle down.

DIFFICULT DRIVING ON MARS

Driving on Mars involves unique problems. Air-filled tires will not work in the thin atmosphere, and solid wheels would grind to a halt, clogged with fine martian dust. Gas and diesel engines won't work, so any vehicle needs to be powered by electricity. The vehicle will also face a lot of obstacles on the ground, such as sharp rocks and sand dunes. Fortunately, gravity on Mars is so weak that heavy vehicles – NASA's one here weighs about 5,500 lb (2,500 kg) on Earth – will weigh much less on Mars.



For the curious

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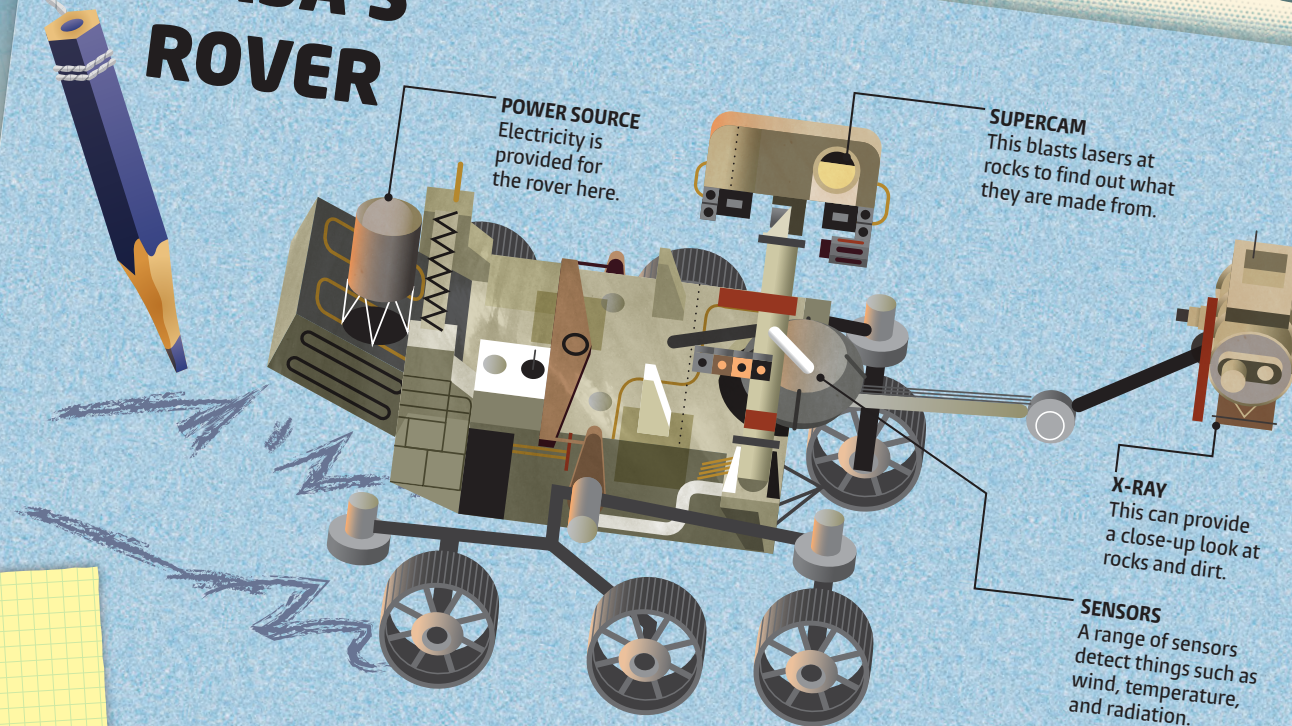
A NEW GENERATION

It's not all about humans going to Mars. Robotic rovers are getting better and better, and new generations of rovers continue to discover more about the planet.

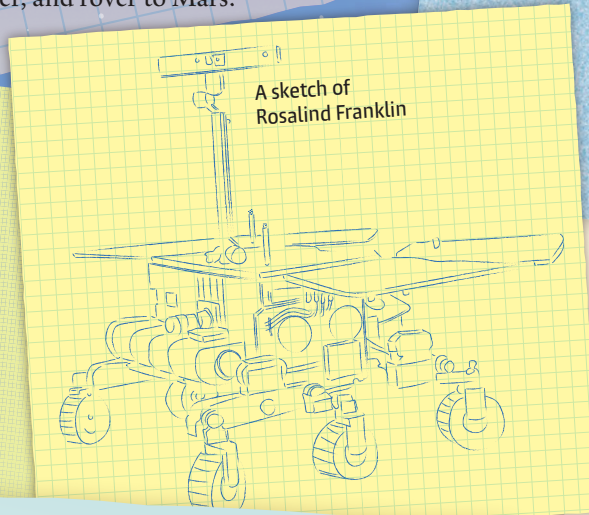
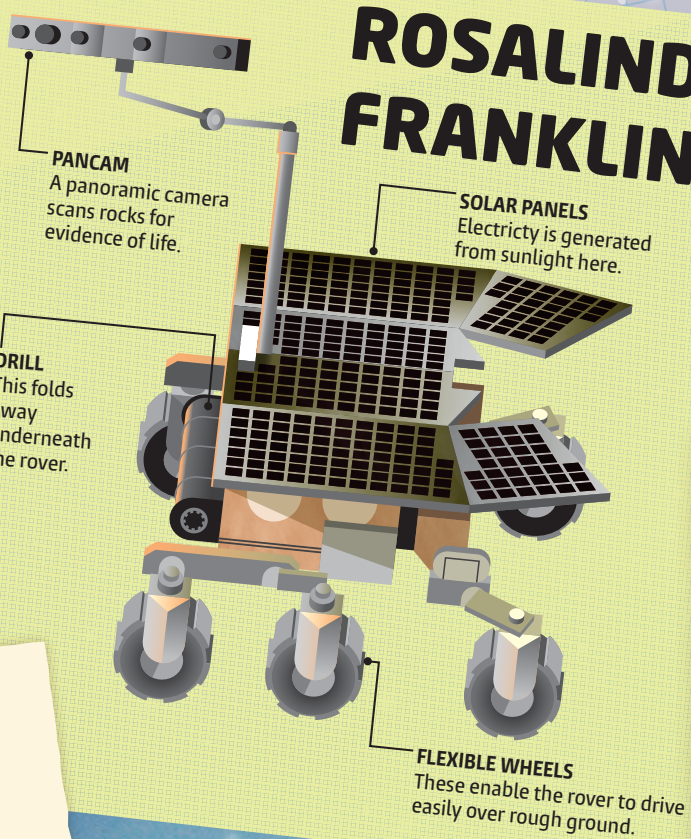
ExoMars, a joint project between ESA and the Russian State Space Corporation, also known as Roscosmos, is hoping to find the building blocks of life on Mars. Their rover is called Rosalind Franklin, named after the scientist who helped to discover the structure of DNA. NASA also plans to

make new discoveries with its rover, which is an upgrade of Curiosity. One of its jobs is to collect rock samples, which will be brought back to Earth by a follow-up robotic mission. China's space agency (China National Space Administration) also hopes to send an orbiter, lander, and rover to Mars.

NASA'S ROVER



ROSALIND FRANKLIN



Space agency: ExoMars (ESA and Roscosmos)
Mission goals: Create maps of the ground underneath the landing site; search for water and ice in martian soil; try to find signs of past martian life.

Space agency: NASA
Mission goals: Hunt for evidence of ancient life; prepare samples for retrieval by a future robot mission; test technology for future crewed landings.

WHY MORE ROBOTS?

Despite plans for human missions to Mars, rovers still have a key role to play. Not only do they help us to explore as much of Mars as possible, but they can also lay the groundwork for human missions. They are good explorers that are cheaper than humans, and sending robots means human lives aren't put at risk.

CHINA'S LANDER



Space agency: China National Space Administration
Mission goals: Take photos from orbit; use laser to see under the surface of Mars; search for methane to collect evidence of living things on Mars.



HOW WOULD YOU EXPLORE MARS?

Scientists have been dreaming about putting humans on Mars for many years. In the next 20 years, it could finally become a reality. Reaching and exploring the Red Planet is a complicated feat of engineering!

DRAW A PICTURE OF YOUR MARS SPACECRAFT DESIGN AND DESCRIBE HOW IT WORKS.



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